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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,105	07/13/2001	Toshiki Tachikawa	107292-00023	1324
4372	7590	07/19/2006	EXAMINER NGUYEN, LAM S	
ARENT FOX PLLC 1050 CONNECTICUT AVENUE, N.W. SUITE 400 WASHINGTON, DC 20036			ART UNIT 2853	PAPER NUMBER

DATE MAILED: 07/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.



## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 3, 5, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by M.

Pavlovic (BEAM OPTICS STUDY OF THE GRANTRY BEAM DELIVERY STSEM FOR LIGHT-ION CANCER THERAPY) (The reference was submitted by the applicant on 09/25/2001).

Pavlovic discloses a charged-particle beam irradiator (*FIG. 1a*) comprising:

a plurality scan electromagnets for one direction (*page 16, third paragraph: Two scanners for one direction that is for the bending plane. The first scanner deflects the beam away from the axis, the second one brings it back*) provided on an entrance side of a final deflection electromagnet (*FIG. 7: The scanners X1-2, Y are placed at the entrance of the final deflection electromagnet (bending magnet) indicated as BEGINNING OF BEND-DOWN DIPOLE*) to scan a charged-particle beam to expand an irradiation field, and

a controller controlling the plurality of said scan electromagnets so that kicks provided by the plurality of said scan electromagnets are combined in said one direction to form a collimated irradiation field at an exit of said final deflection electromagnet (*page 16, third paragraph: The scanners are controlled to deflect the beam such that the local point of the bending magnet (the final deflection electromagnet) is hit, so even parallel scanning occurs*).

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**Referring to claim 3:** wherein said plurality of scan electromagnets (*Fig. 4, elements 100, 110*) are interposed between said final deflection electromagnet (*Fig. 6-7: The bending magnet at about 16-18 m*) and a deflection electromagnet (*Fig. 6-7: The bending magnet at about 7-8 m*) disposed on an entrance thereof.

**Referring to claim 5:** wherein said plurality of scan electromagnets disposed independent of each other in X and Y directions (*FIG. 7*).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 4, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akiyama et al. (US 6218675) in view of M. Pavlovic (BEAM OPTICS STUDY OF THE GRANTRY BEAM DELIVERY STSEM FOR LIGHT-ION CANCER THERAPY).

Akiyama et al. discloses a charged-particle beam irradiator comprising a plurality scan electromagnets (*Fig. 4, elements 100, 110*) provided on an entrance side of a final deflection electromagnet (*Fig. 4, element 9*) to scan a charged-particle beam to expand an irradiation field.

a controller controlling the plurality of said scan electromagnets so that kicks provided by the plurality of said scan electromagnets to form a collimated irradiation field at an exit of said final deflection electromagnet (*column 8, line 40 to column 9, line 27: The beam is outputted from the bending electromagnet 9 (the final deflection electromagnet) in a direction parallel to the design center trajectory of the beam (column 9, lines 20-23)*)).

Akiyama et al., however, does not disclose wherein the plurality of scan electromagnets is for one direction.

Pavlovic discloses a charged-particle beam irradiator (FIG. 1a) comprising a plurality scan electromagnets for one direction (*page 16, third paragraph: Two scanners for one direction that is for the bending plane. The first scanner deflects the beam away from the axis, the second one brings it back*) provided on an entrance side of a final deflection electromagnet (FIG. 7: *The scanners X1-2, Y are placed at the entrance of the final deflection electromagnet (bending magnet) indicated as BEGINNING OF BEND-DOWN DIPOLE*) to scan a charged-particle beam to expand an irradiation field.

Therefore, it would have been obvious for one having ordinary skill in the art at the time invention was made to modify the charged-particle beam irradiator disclosed by Akiyama et al. so the scanning electromagnets are for one direction as suggested by Pavlovic. The motivation for doing so would have been to drive the beam to hit the bending magnet at its focal point in order to obtain even parallel scanning as taught by Pavlovic (*column page 16, third paragraph*).

**Akyama et al. also discloses the following claimed inventions:**

**Referring to claim 3:** wherein said plurality of scan electromagnets (*Fig. 4, elements 100, 110*) are interposed between said final deflection electromagnet (*Fig. 4, element 9*) and a deflection electromagnet (*Fig. 4, element 6*) disposed on an entrance thereof.

**Referring to claim 4:** wherein said plurality of scan electromagnets (*Fig. 4, elements 100, 110*) are disposed upstream from a deflection electromagnet (*Fig. 4, element 8*) disposed on an entrance of said final deflection electromagnet (*Fig. 4, element 9*).

**Referring to claim 5:** wherein said plurality of scan electromagnets (*Fig. 4, elements 100, 110*) disposed independent of each other in X and Y directions.

***Allowable Subject Matter***

3. Claims 2, 7-10, and 11-13 are allowed.

The reasons for allowance of claims 2 and 7 were indicated in the previous office action.

Claims 8-10 and 11-13 are allowed because they depend directly/indirectly on claim 2 or 7.

***Response to Arguments***

Applicant's arguments filed 04/27/2006 have been fully considered but they are not persuasive.

The applicant argued that Pavlovic did not disclose or suggest at least the feature of a controller controlling the plurality of scan electromagnets. Pavlovic on page 16, third paragraph teaches that "Two scanners for the bending plane must be used in order to overcome the problem. The first scanner deflects the beam away from the optical axis, the second one brings it back. If the local point of the bending magnet is hit, even parallel scanning occurs". This can be understood that an associate controller controls the deflection of the first scanner to bend the beam away from the scanner axis, then controls the deflection of the second scanner to bend the beam back to the scanner axis in a manner that hits the local point of the bending magnet to form collimated (parallel) irradiation beam. In addition, the applicant argued that Pavlovic does not disclose a plurality of scan electromagnets to scan a charged-particle beam to expand an irradiation field. As clearly shown in Pavlovic's FIG. 6, the irradiation field of the beam after scanned by the scanners are wider compared to the irradiation field of the beam before scanned by the scanners. Finally, the applicant argued that there was motivation or desirability to

combine disclosed in the references. The applicant please be advised that a suggestion or motivation need not be expressly stated in one or all of the references used to show obviousness, but can be from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference (*In re Bozek*, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969)).

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S. NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D. MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LN  
07/11/2006



**STEPHEN MEIER**  
**SUPERVISORY PATENT EXAMINER**